

**GEORGIA INSTITUTE OF TECHNOLOGY**  
**OFFICE OF CONTRACT ADMINISTRATION**  
**RESEARCH PROJECT INITIATION**

Date: December 11, 1975

Project Title: **Presentation of Radiological Safety and Laboratory Techniques Course**

Project No: **C-10-507**

Principal Investigator: **Dr. M. W. Carter**

Sponsor: **DHEW, Center for Disease Control, Personnel Management Office**

Agreement Period: From 12/3/75 Until 2/4/76

Type Agreement: **Contract No. 200-76-0612 (Fixed Price)**

Amount: **\$9,998**

Reports Required: **Report of Training Session**

Sponsor Contact Person (s): **Technical Matters**  
**Robert L. McClure**  
**Project Officer**  
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**Atlanta, Georgia 30333**

*Know him well - Ahh*

**Contractual Matters**  
→ **R. Emmet Howe**  
**Contracting Officer**  
**Procurement and Material**  
**Management Office**  
**Center for Disease Control**  
**Atlanta, Georgia 30333**

Assigned to: **Office of Interdisciplinary Programs**

**COPIES TO:**

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School Director	Rich Electronic Computer Center
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Patent Coordinator	Other _____

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION  
SPONSORED PROJECT TERMINATION

Date: August 19, 1976

Project Title: Presentation of Radiological Safety and Laboratory Techniques Course

Project No: C-10-507

Project Director: Dr. M. W. Carter

Sponsor: DHEW, Center for Disease Control

Effective Termination Date: 2/4/76

Clearance of Accounting Charges: ALL CLEAR

Grant/Contract Closeout Actions Remaining: None

- ☐ Final Invoice and Closing Documents
- ☐ Final Fiscal Report
- ☐ Final Report of Inventories
- ☐ Govt. Property Inventory & Related Certificate
- ☐ Classified Material Certificate
- ☐ Other \_\_\_\_\_

Assigned to: ERC (School/Laboratory)

COPIES TO:

Project Director  
Division Chief (EES)  
School/Laboratory Director  
Dean/Director—EES  
Accounting Office  
Procurement Office  
Security Coordinator (OCA) ✓  
Reports Coordinator (OCA)

Library, Technical Reports Section  
Office of Computing Services  
Director, Physical Plant  
EES Information Office  
Project File (OCA)  
Project Code (GTRI)  
Other \_\_\_\_\_

RADIOLOGICAL SAFETY  
AND  
LABORATORY TECHNIQUES

FINAL REPORT  
TO THE  
CENTER FOR DISEASE CONTROL  
U.S. PUBLIC HEALTH SERVICE  
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

December 30, 1975  
Office of Interdisciplinary Programs  
Georgia Institute of Technology  
Contract No. 200-76-0612

## RADIOLOGICAL SAFETY AND LABORATORY TECHNIQUES

### SUMMARY

The five-day technical short course, "Radiological Safety and Laboratory Techniques", was conducted on the campus of the Georgia Institute of Technology, primarily in facilities of the Department of Continuing Education. It was designed for and presented to a group of selected personnel from the Center for Disease Control (CDC) during the period December 8-12, 1975.

Sponsorship was by the CDC and the Office of Interdisciplinary Programs and the School of Nuclear Engineering of Georgia Tech. Funding, under a fixed price contract, was provided by the CDC, whereas services and facilities necessary to conduct the course were furnished by Georgia Tech.

The course was designed for approximately twenty students. Actually, eighteen participated in parts of the program and sixteen satisfactorily completed the requirements and were awarded certificates. Several individuals from the CDC participated as observers in various parts of the training activity.

Based on student evaluations, the consensus appears to be that the content and conduct of the short course were interesting, informative, and appropriate. A number of useful comments and suggestions were made in the evaluation process.

The training experience seems to have been successful in attaining the objectives of supplying relevant information and data to the group on a balanced basis, providing a scientific background, demonstrating laboratory techniques and radiological safety procedures, and identifying certain available resources which can be used in the individuals work environment. Major emphasis was placed on specific laboratory methods employing radionuclides and related radiological safety requirements and procedures.

### STUDENTS

Trainees were selected for participation by the CDC. Many volunteered for the training program whereas certain ones were recommended by supervisors. A prime criterion was whether the training would be applicable to improving job performance.

The short course was designed for approximately twenty students and sixteen satisfactorily completed all requirements. Eighteen individuals participated in certain phases of the training program and provisions were made to accommodate several observers from the CDC.

Students were all employed by the CDC and were selected for training by pertinent officials of the CDC. A roster of participants, indicating general backgrounds, is enclosed.

Each of the sixteen students satisfactorily completing the requirements was awarded a certificate of completion. The training program was assigned

4.0 Continuing Education Units as required by Standard Nine of the Southern Association of Colleges and Schools and each student can obtain an official transcript through the Georgia Tech Registrar.

Students were assigned dosimeters which were worn while working with radioactivity. Student accumulative exposures were individually less than one millirem for the training experience.

### FACILITIES

Facilities of the Department of Continuing Education were used to conduct the lecture and certain demonstration portions of the short course. This Department also provided logistical support including registration and reproduction and distribution of handout materials.

Laboratories and certain demonstrations were presented in facilities of the School of Nuclear Engineering, School of Biology, and the Nuclear Research Center. These were satisfactory for providing suitable space to accommodate small groups of students as laboratory teams.

Parking space was readily available on campus and its use was facilitated by providing parking permits to the scheduled participants prior to course beginning. Meal service at lunch time was available at the Student Center and Faculty Lounge and at near-by off campus restaurants.

### EQUIPMENT

During the laboratory sessions, students gained practical experience by using a variety of instruments. These included several end-window proportional counters for alpha and beta particle counting, Geiger-Muller counters, and scintillation and solid state detectors for gamma radiation measurements.

Two multi-channel analyzers were available and used as follows: a Canberra analyzer, with 1,024 channels, in association with a Ge (Li) detector and a simpler multi-channel analyzer with a sodium iodide scintillation detector.

A total of three liquid scintillation counters were used by the students. These were Beckman Models LS100 and LS200 and a Searle Model Mark 2. A Packard sample oxidizer, Model 306, was used to prepare biological samples for liquid scintillation counting.

Survey meters included ionization chamber types for relatively high level radioactivity measurements as well as Geiger-Muller types for determinations of lower levels. Various instrument probes were utilized and certain ones were interchangeable with rate meters and integrating devices. These meters are extensively used in health physics activities.

### STAFF

The teaching staff for the short course consisted of experts from academic institutions, government agencies, and industry. They represented a broad spectrum of interests, experience, and points of view. Most were from Georgia Tech's Office of Interdisciplinary Programs, School of Nuclear Engineering, and Nuclear Reactor Center.

Special assistance in preparing and conducting the laboratories was provided by staff representing nuclear equipment manufacturers and the School of Nuclear Engineering and the Nuclear Reactor Center.

The caliber of individuals willing to participate as teachers in a technical short course of this kind is outstanding. Their cooperation and assistance were of major importance in presenting an effective training program. A list of the teaching faculty, including titles and affiliations, is enclosed.

### CURRICULUM

Approximately, forty-two hours of instruction were presented during the five-day short course. Lectures were usually one hour in length and several subjects required the dedication of several lectures for adequate coverage. Several breaks were scheduled each day to provide a change of pace and to allow more personal interaction of the teachers with the students.

Four laboratories, each two and one half hours in length, were scheduled. These were divided into specific sections which could be taught on a small group basis. This provided the opportunity for the students to work with specialized equipment and apparatus and perform laboratory operations.

The content of the short course is shown in the enclosed copy of the program. The subjects covered are identified as are the amounts of time devoted to each aspect of the program. Most speakers provided the students with lecture outlines, detailed papers, including graphs and charts, specific references, and other relevant information and data. These materials were compiled into a loose leaf style manual, which should be valuable to each student as a personal resource.

Subsequent to the course completion, each student was presented with a copy of the "Radiological Health Handbook". This publication of the Bureau of Radiological Health, Food and Drug Administration, is a comprehensive, useful reference for those working with radionuclides and related safety procedures.

A progress quiz and a final examination were integral parts of the course. Copies of these materials are enclosed. In addition, a panel presentation was used in providing a review of the course.

Students were expected to review classroom notes, engage in reading pertinent parts of their manuals, and devote extra classroom time to completion of the laboratory assignments. From classroom performance and individual progress, it appeared this expectation was achieved.

#### EVALUATION

These comments are primarily based on a review of the short course evaluation forms completed by each student at the conclusion of the training program. A copy of the evaluation form is enclosed and copies of the completed forms have been furnished to the Project Officer.

The evaluation form is one normally used in our Continuing Education programs. It relates to general organization and conduct of training activities. The participants were overwhelmingly complimentary to the course organization and presentation. However, several suggestions were made relative to the handouts, audiovisual use, and specific lecturers. These will be given appropriate consideration in developing and conducting future programs.

Participants seemed to feel the training experience would be useful in performing their jobs. Most felt an appropriate balance had been achieved between fundamentals and practical applications. This fact is especially satisfying as the developmental efforts were essentially devoted to designing a practical training program directly related to general work practices of the group to be trained.

Several students expressed an interest in additional training which would be uniquely oriented to the specific procedures they use on a day-to-day basis. Training, to meet such expressed needs, could be provided to relatively small, specialized groups using the appropriate equipment and pertinent laboratory procedures.

This training experience will normally qualify an individual to meet the specific licensing requirements of pertinent regulatory agencies for laboratory use of tracer quantities of radionuclides. It provided a relevant background to understand and use radionuclides in the laboratory setting in a safe and effective manner.